

What is claimed is:

1. An apparatus for collision resolution in a home networking system using carrier sense signals, the apparatus comprising:

5 a received frame state extraction unit, which extracts a current state CurST of a frame including carrier sense signals received by a station that is connected to a network, a data transmission priority RxPRI of the received frame, and a reference time signal do\_FBOS for determining a final state of the carrier sense signals of the received frame;

10 a maximum back-off level (MBL) calculation unit, which calculates MBL values MBL\_reg based on the current state CurST, the priority RxPRI, and the reference time signal do\_FBOS;

MBL registers, which store the MBL values MBL\_reg;

15 a back-off level (BL) calculation unit, which calculates BL values BL\_reg based on the current state CurST, the priority RxPRI, the reference time signal do\_FBOS, and the MBL values MBL\_reg; and

BL registers, which store the BL values BL\_reg.

20 2. The apparatus of claim 1, wherein the reference time signal do\_FBOS is assigned to a last section of a back-off slot section in the received frame to determine the final state of the carrier sense signals.

25 3. The apparatus of claim 1, wherein when the received frame is determined as a normal frame, if the MBL value MBL\_reg of a previous frame is 0, the MBL\_reg becomes 0, and if the MBL value MBL\_reg of the previous frame is not 0, the MBL value MBL\_reg is obtained by subtracting 1 from the MBL value MBL\_reg of the previous frame, after it is determined that the priority RxPRI and the MBL value MBL\_reg of the previous frame are the same, and

30 when the received frame is determined as a collision frame, if the MBL value MBL\_reg of the previous frame is 0, the MBL value MBL\_reg is obtained by adding the MBL value MBL\_reg of the previous frame to the number of back-off signals of the received frame, and if the MBL value MBL\_reg of the previous frame is not 0, the MBL value MBL\_reg is obtained by subtracting 1 from the value which is obtained by adding the MBL value MBL\_reg of the previous frame to the number of back-off signals.

35 4. The apparatus of claim 1, wherein when the received frame is determined as a normal frame, if the BL value BL\_reg of a previous frame is 0, the BL value BL\_reg is set to 0, and if the BL value BL\_reg of the previous frame is not

0, the BL value BL\_reg is obtained by subtracting 1 from the BL value BL\_reg of the previous frame, after it is determined that a corresponding station is in a data transmission standby state and a priority RxPRI of the received frame is the same as a BL value BL\_reg of the previous frame;

5           when the received frame is determined as a collision frame, if a pseudo random number generator (PRNG) value generated in a PRNG circuit of a media access control (MAC) in the station is 0, the BL value BL\_reg of the previous frame becomes the BL value BL\_reg;

10           when the received frame is determined as a collision frame, if the PRNG value is not 0 and the BL value BL\_reg of the previous frame is 0, the BL value BL\_reg is obtained by adding the BL value BL\_reg of the previous frame to the number of back-off signals that are observed prior to a corresponding back-off slot; and

15           when the received frame is determined as a collision frame, if the PRNG value is not 0 and the BL value BL\_reg of the previous frame is not 0, the BL value BL\_reg is obtained by subtracting 1 from the value which is obtained by adding the BL value BL\_reg of the previous frame to the number of back-off signals observed prior to the PRNG value.

20           5.       The apparatus of claim 1, wherein each of the MBL registers and the BL registers are assigned to each of the priority slots of the received frame, and each of the priority slots is designed to accommodate more than 5 bits to provide collision resolution to a maximum of 25 stations.

25           6.       A method for collision resolution in a home networking system using carrier sense signals, the method comprising:

30           extracting a current state CurST of a frame including carrier sense signals received by a station that is connected to a network, a data transmission priority RxPRI of the received frame, and a reference time signal do\_FBOS for determining a final state of the carrier sense signals of the received frame;

          calculating MBL values MBL\_reg based on the current state CurST, the priority RxPRI, and the reference time signal do\_FBOS;

          storing the MBL values MBL\_reg;

35           calculating BL values BL\_reg based on the current state CurST, the priority RxPRI, the reference time signal do\_FBOS, and the MBL values MBL\_reg; and  
          storing the BL values BL\_reg.

7. The method defined by claim 6 wherein said calculating MBL values comprises:

5 8. The method defined by Claim 6 wherein said calculating BL values comprises: